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A review on ethnobotanical studies of medicinal plants use by agro-pastoral communities in, Ethiopia

Yeneayehu Fenetahun and Girma Eshetu

Abstract

Ethiopian plants have shown remarkably effective medicinal values. Medicinal plants and knowledge of their uses provides a vital contribution to human and livestock health care needs throughout Ethiopia. This paper reviews and discusses on role of medicinal-plant use by local communities, traditional utilization and management practices in Ethiopia. The literature review was done by collecting relevant information from journal articles, books and electronic resources. Despite the wide role of medicinal-plant use by local communities, traditional utilization and management practices are not well reviewed and documented. The review sums up the following key points on the management practice, current status and threats on medicinal plants. (1). Awareness raising activities should be undertaken additionally, (2), Attention should be given to the usage of traditional medicine and management and conservation activities, (3), Establishing Traditional Healers Associations is very essential and (4) Further and relevant scientific research should be conducted on medicinal plants to dig out their quality, efficacy and safety.

Keywords: Ethnobotany, conservation, indigenous knowledge, medicinal plants

1. Introduction

Ethnobotany is the study of people's classification, management and use of plants. It is defined as "local people's interaction with the natural environment: how they classify, manage and use plants available around them" [51, 13]. From the beginning of humanity, indigenous people have developed their own locality specific knowledge on plant use management and conservation [13]. This complex knowledge, systems of beliefs and practices generally known as indigenous knowledge or traditional knowledge. Indigenous knowledge has developed as a result of human interaction with their environment. In this view, ethnobotanical studies are useful in documenting, analyzing and communicating knowledge and interaction between biodiversity and human society, how diversity in nature is used and influenced by human activities [51, 9, 13]. The ethnobotanical approach is also important as it involves local communities in the conservation of biodiversity. This is based on the idea that the healthiest ecosystems of the world are under the control of local communities, and local communities manage many species for which science has little information [53].

Thus, the need to undertake ethnobotanical researches and to document medicinal plants and associated indigenous knowledge has come to be an urgent task as already underlined by [61, 40]. But little emphasis has been given to ethnobotanical (ethnomedicinal) studies over the past decades [17, 56]. Even if there has been some attempt in investigating medicinal plants and indigenous knowledge on sustainable use and management of plant resources. It one precondition for making ethno botanical work effective is to be aware of the range of methods and approaches and to be able to choose the most appropriate ones for the Problem at hand.

Ethiopia is a country with various types of climatic, topographic, soil features and different altitudes. This makes the country to have a rich and diverse fauna and flora. And these Ethiopian plants have shown remarkably effective medicinal values for many ailments that affect people and livestock. Knowledge of the medicinal plants of Ethiopia and of their uses provides a vital contribution to human and livestock healthcare needs throughout the country [2, 35-37, 67].

In Ethiopia, about 80% of the human population and 90% of livestock rely on traditional medicines [34, 39, 23, 31, 37]. The majority of medicinal plants are harvested from wild habitats, which are currently under great threat [84].

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There are reports indicating that many potentially useful plants are disappearing throughout the world, and Ethiopia is not exceptional. Traditional medicine is an integral part of the culture, belief structure and lifestyle of Ethiopian people's [18, 72]. The issue of medicinal plant conservation in Ethiopia today calls for aggressive studies and documentation before accelerated ecological and cultural transformation distorts the habitats of these plants and culturally held knowledge bases [21]. Loss of medicinal plants is attributed to conversion and destruction of habitats, overexploitation and use of destructive harvesting techniques [84, 43, 42, 38, 58].

Since most traditional knowledge in Africa is transmitted orally, from generation to generation, knowledge of wild plants is in danger of being lost as habitats, value systems and natural environments change [25, 39, 31]. Thus, valuable indigenous knowledge associated with medicinal plants warrants proper documentation [70, 23, 71]. A review of the main sources shows that studies on medicinal plants of Ethiopia have so far concentrated in the south, southwest, central, north and north western parts of the country [6]. The pastoral and agro-pastoral communities of Ethiopia are largely found in the eastern, south eastern and north eastern parts of the country, i. e. the Somali, Oromo and Afar pastoralists constitute 87 percent of the total pastoralist population in Ethiopia [62].

Still now the dependences on this medicine is continuing because of its accessibility, affordability and also modern health services, which are mostly unaffordable to most people, are also very limited in their coverage while on the other hand there is general acceptance of the traditional herbal medical system by the community. As the local communities encounter cultural changes due to the current development activities in areas where these communities reside, unless the plants are conserved and the ethnomedicinal knowledge is documented, both the medicinal plants and the associated indigenous knowledge of the people could vanish forever. The share of medicinal plants and the value of the associated indigenous knowledge of the agro-pastoral communities are expected to be high. Thus, intensive review on ethnobotanical research plays a vital role to assess and document information on plants and related indigenous knowledge for conservation and sustainable utilization, since ethnomedicinal healing systems vary across cultures.

However, since Ethiopia has diverse in topography as well as culture, there is no any documented data that assess the resource potential, indigenous knowledge on the use and management of medicinal plant species. This review therefore, aimed to, documentation of scientific data on the medicinal plants and the associated knowledge of using, managing and conserving medicinal plants and threatening factors, that used by different part of Ethiopia.

2. Ethnobotany

2.1 The Emergence and Progress of Ethnobotany

Traditional people around the world possess unique knowledge of plant resources on which they depend for food, medicine and general utility including tremendous botanical expertise [51]. Although various animal and mineral products contribute to human welfare, the plant kingdom is most essential to human wellbeing especially in supplying his basic needs. The relationship between humans and plants is as old as human existence on earth. This close interaction and dependency of humans on plants is studied under the field of ethnobotany. Ethnobotany tries to find out how local people have traditionally used plants for various purposes and how they incorporate plants into their cultural traditions to develop

attitudes and beliefs [9].

Ethnobotany is formed from two words, 'ethno' which means the study of people and 'botany' which means study of plants. As it was reported [13], the term Ethnobotany was defined differently depending on the interest of the workers involved in the study. The first person who proposed the term ethnobotany in 1895 was Harshberger [9]. Harshberger 1896; cited in [13] defined ethnobotany as the study of the use of plants by aboriginal people. Moreover, others defined ethnobotany as the study of direct interaction between humans and plants [51, 9]. Similar definition stated that, ethnobotany is the study of direct interrelations between humans and plants, including plants used as food, medicines and for any other economic applications [27]. In any case, ethnobotany is a broad term, which is considered the study of direct interaction and interrelationships between humans and plants [51].

It is both an interdisciplinary and multidisciplinary science [44, 51] which focuses on compiling, analyzing, documenting and use of indigenous knowledge (IK) on plants as well as the proper utilization, conservation and management strategies [51]. Moreover, [13, 9]. Described ethnobotany, as a useful science to explain the useful plants and associated indigenous knowledge of local community as well as their utilization and management. According to [51, 9] ethnobotany is the scientific investigation of plants as used in indigenous cultures in food, medicine, magic, rituals, building, household utensils and implements, fire wood, pesticides, clothing, shelter and other purposes and is also used to define local community plant resource needs, utilization and management. Hence, ethnobotanical study is very crucial for biodiversity and human society and to understand how it is valued and influenced by human activities within different human societies [51].

2.2 Indigenous Knowledge

Indigenous knowledge refers to the accumulation of knowledge, rule, standards, skills, and mental set, which are possessed by local people in a particular area [63]. It is the result of many generations' long years' experiences, careful observations and trial and error experiments [51].

Traditional people around the world possess unique knowledge of plants resources on which they depend for food, medicine and general utility including tremendous botanical expertise [51]. Over centuries, indigenous people of different localities have developed their own specific knowledge on plant resource use, management and conservation [13]. Systematic application of indigenous knowledge is important for sustainable use of resources and development [75]. Indigenous knowledge develops and changes with time and space with change of resource and culture.

Therefore, such knowledge includes time tested practice that developed in the process of interaction of humans with their environment [3, 9, 13]. Indigenous knowledge of a people, as defined by the Convention on Biological Diversity (CBD), is knowledge held by a people based on a "combination of cultural distinctiveness and prior territorial occupancy relative to a more recently arrived population with its own distinct and subsequently dominant culture". It thus falls within the definition of traditional knowledge but not vice versa [12]. Indigenous knowledge is usually unwritten and preserved only through oral tradition, and it refers to the knowledge system of indigenous people and minority cultures [48].

According to [66] indigenous knowledge is knowledge that is unique to a given culture or society. It is the basis for local-level decision making in agriculture, health care, food

preparation, education and natural resource management. It is also referred to as “traditional knowledge”, “folk knowledge”, “ancient wisdom” or “ethno science” [86]. Traditional knowledge also encompasses belief systems that play a fundamental role in a people’s livelihood, maintaining their health, and protecting and replenishing the environment [66].

The term “traditional” used in describing this knowledge does not imply that this knowledge is old or not technical in nature, but “traditional based”. It is “traditional” because it is created in a manner that reflects the traditions of the communities, therefore not relating to the nature of the knowledge itself, but to the way in which that knowledge is created, preserved and disseminated [53]. Traditional knowledge is collective in nature and is often considered the property of the entire community, and not belonging to any single individual within the community. Local knowledge is transmitted through specific cultural and traditional information exchange mechanisms for example, maintained and transmitted orally through elders or specialists (breeders, healers, etc.), and often to only a selective few people within a community [3, 51, 75, 63, 66]. It can also be transmitted from generation to generation in the form of songs, proverbs, stories, folklore, community laws, common or collective property and inventions, practices and rituals.

One of the indigenous knowledge is knowledge on the use of plants by humans as medicines. When primitive man started to select his food from plants growing nearby, he must have kept some of those which he found to cure some of the ailments or which he thought would cure disease [54]. In similar way [29], reported that throughout history, humans had been looking to nature to provide them, with remedies for their various maladies. In so doing, they had been using a trial and error approach to sort-out which plants are therapeutic and which are not, and further which are too toxic to use. Through the centuries some of these plants have been used successfully in the treatment of disease and later on they constituted the basis for many of the modern day drugs.

2.3 Medicinal Plants in Ethiopia

The various climatic and topographic conditions of the country contributed to a rich biological diversity. Ethiopia is believed to be home for about 6,000 species of higher plants with approximately 10% endemism [83]. Similarly as it was reported by [41], the flora of Ethiopia consists of an estimated number of 6000 species of higher plants with 10-12% endemism. The diversity is also considerable in the lower plants but exact estimate of these have to be made. The genetic diversity contained in the various biotic make up is also high thus making the country a critical diversity hot spot for plants [81]. As one of the 12 the Vavilovian centers of origin/ diversity for domesticated crops and their wild relatives, it is home of many endemic crops and genetic stocks [82, 21]. The biodiversity richness of Ethiopia was known since 5000 years ago when ancient Egyptians Greeks and Romans used it as a source of unique commodities like Frankincense, Myrrh and other plant products, which are also used for medicine preparation [76].

Medicinal plants species are also part of those many plant species of the country. Like all other parts of the world, plants are used as a source of medicine in Ethiopia. According to [16], 95% of traditional medicinal preparations are of plant origin. In Ethiopia, plants have been used as a source of traditional medicine from antiquity to solve different health problems and human sufferings [8, 46].

Due to its long period of practice and existence, traditional

medicine has become an integral part of the culture of Ethiopian people [59, 55]. Most Ethiopian traditional medicinal knowledge is kept in strict secrecy; however, it is dynamic in that the practitioners make every effort to widen their scope by reciprocal exchange of limited information with each other or through reading the traditional pharmacopeias [16]. It is not easy to get traditional medicinal knowledge of the healers because they claim that the knowledge is their own and wanted to transfer their knowledge only to a person they want to pass, mostly to the eldest son. This becomes practical when they approach death [45].

The use of plants in religious ceremonies as well as for magic and medicinal purposes is very common and widely distributed in Ethiopia [4]. According to [17], there is a large magnitude of use and interest in medicinal plants in Ethiopia due to acceptability, accessibility and biomedical benefits. Even today, it is common for people living in rural and urban areas to treat some common ailments using plants available around them (example, *Hagenia abyssinica* to expel tapeworm, *Rutachalepensis* for various health problems) [1]. The work of [18] in northern Ethiopia clarified that major portion (87%) of the parts used in traditional medicine come from plant source. At this very moment, somewhere in the rural hinterland of the Ethiopian rural communities, a local farmer may have just gathered leaves or root parts from a local medicinal plant found near the homestead. In a nearby village, a mother might be in the midst of preparing a traditional plant treatment believed to ‘restore strength’, relieve stomach cramps, heal a skin condition, and ‘ward off the evil-eye’ or perhaps to help alleviate symptoms of a respiratory tract infection. [16] gives three treatment features of Ethiopian traditional medicines i.e. curative, prophylactic and preventive. Sometimes, the treatment could have a curative as well as a prophylactic effect and it is occasionally claimed that the prophylaxis could even be genetically fixed and can protect the offspring. Preventive remedies are usually prepared as ornamental, to be borne by the patients against evil spirits or psychosomatic disorders. The study of Ethiopian medicinal plants has not been realized as fully as that of India or other traditional communities elsewhere [43].

In Ethiopia there is limited development of therapeutic products and the indigenous knowledge on usage of medicinal plants as folk remedies are getting lost owing to migration from rural to urban areas, industrialization, rapid loss of natural habitats and changes in life style. There is also a lack of ethnobotanical survey carried out in most parts of the country. In view of these, documentation of the traditional use of medicinal plants is an urgent matter and important to preserve the knowledge [69, 78].

2.4 Medicinal plant diversity and distribution in Ethiopia

Different vegetation types that are found in the various agro ecological zones of Ethiopia accommodate various types of medicinal plants [20]. Ethiopia is a country with a great range of ecological diversity and climatic conditions [18, 17]. The number of plant species in each corner of the country and the vegetation type is also varied ranging from arid low land to Afroalpine vegetation [2]. Similarly, it was reported that the variation in vegetation type of the country is due to the country’s significant geographical diversity [74]. As it was reported by [20], the wood lands, montane vegetation including grassland, forests and the evergreen scrubs and rocky areas contain more medicinal plants which indicated that traditional medicinal plant species are not equally distributed throughout the country similar to the distribution of the total plant

species. According to this report the vegetation types found in the wood lands contain more medicinal plant species while the Afroalpine vegetation consists of the least medicinal plants of all the vegetation types [20, 21].

The number of different languages spoken in Ethiopia approaches 90 [50] and each corresponds to its unique socio-cultural population thus amounting to the high human cultural diversity. Each of these cultural domains has its own set of written and/or oral pharmacopoeias with the medicinal use of some species being restricted to that given culture. [45] Asserts that Ethiopia has rich medicinal plant lore and points out that almost all plants of the Ethiopian flora are used somewhere somehow medicinally. Other workers on the other hand estimated about 60% of the flora to be medicinal, and most sources give about 10% of the vascular flora to be medicinal.

2.5 Role of medicinal plants

Plants have played crucial role as a source of traditional medicine in Ethiopia from the time immemorial to combat different ailments and human sufferings [8, 46]. The antiquity of the traditional use of medicinal plants in Ethiopia could never be disregarded [60, 56]. Due to accessibility, acceptability and biomedical benefits there is a large magnitude of use and interest of medicinal plants in Ethiopia [17]. The plant materials include seeds, berries, roots, leaves, bark or flowers are used for medicinal value. During the past decades, public interest in natural therapies, namely herbal medicine, has increased dramatically not only in developing countries but mainly in industrialized countries [11]. Of the 252 drugs considered as basic and essential by the WHO, 11% are exclusively of plant origin and a number of synthetic drugs are obtained from natural precursors [7].

These plant based drugs provide outstanding contribution to modern therapeutics. Reviews of medicinal textbooks that have been written in Geez or Arabic between 17th and 18th centuries indicated that the majority of Ethiopians, with the exceptions of few privileged groups, starting from the time of the Italian occupation, have been depending almost entirely on the traditional medicine [60].

2.6 Ethnoveterinary Medicine in Ethiopia

Ethnoveterinary medicine involves the use of medicinal plants, surgical techniques and livestock management practices to prevent a range of animal disease [52]. In Ethiopia as well as in most developing countries, animal disease remains one of the principal causes of poor livestock performance, leading to an ever increasing gap between the supply of, and the demand for, livestock products [73]. In Ethiopia, livestock production directly constitutes important

sources of livelihood, in addition to its contribution to crop production [68]. Although the number of livestock population is many in number, disease play role in reduction.

To overcome this problem, many people mainly use traditional medicines to treat their livestock ailments. Plants comprise the largest component of the diverse therapeutic elements of traditional livestock healthcare practices. This is due to the insufficient number of veterinarian drugs and the high cost of most of drugs which is out of the reach of the Ethiopian farmers and pastoralists [57]. This and other similar factors make Ethiopian livestock raises develop their own ways of keeping their animals healthy and productive using locally available materials, predominantly plants.

2.7 Medicinal plants in human healthcare system

As in any African countries, the use of plants in religious ceremonies as well as for magic and medicinal purposes is common in Ethiopia. This knowledge of traditional medicine has been passed on by word of mouth from one generation to the next by herbalists and knowledgeable elders. About 80% of the Ethiopian population depends on traditional medicine for their health care practices. However, as time goes on, the traditional knowledge is gradually worn away for reasons mainly attributed to environmental degradation and deforestation, which in turn brought about the loss of some species including medicinal plants [19]. The use of medicinal plant species as a medicine is as old as man and this makes traditional medicine an integral part of the different cultures of Ethiopian people who are especially vulnerable to underserved health facilities [59, 28].

Plant diversity remains crucial for human well-being and still provides a significant number of remedies required in healthcare. Medicinal plants played a pivotal role in the treatment of various afflictions in Ethiopia [30]. It was reported that the traditional medicines serve mainly for those people living in the rural area as they have no access to modern medical health services due to shortage of modern drugs, health professionals, much more cost of the medicines, un even distribution that is most of the facilities are found in towns but a few or no health facilities are in rural areas [45]. Despite the high value of traditional medicine to Ethiopia societies especially to rural communities, the plant species along with the associated knowledge is lost due to factors such as deforestation and expansion of modern education [61]. Some of the most common medicinal plants that used to most part of Ethiopia and the most popular for even the person that is not traditional healer practitioner medicinal plants are the following.

Table1: Some of the list of ethno-veterinary medicinal plants for treatment of livestock and Human ailments (According to Tesfaye A.2009, Tewolde B.1991, Mresha A.2011, AntenehB.2012)

Botanical/Scientific Name	Family Name	Habit	Preparation and application	Diseases treated
<i>Ipomea sp.</i>	Convolvulaceae	Climber	Grinded seed mixed with water and then applied	Actinobacillosis, Menstruation disorder Abdominal pain
<i>Acmella caulirhiza Del.</i>	Asteraceae	Herb	Roasted leaves grinded and mixed with salt and then applied	Actinobacillosis, Bugunch
<i>Monopsis stellarioides (Presl) Urb.</i>	Lobeliaceae	Herb	Crushed the whole parts and then mixed with little water	Internal Parasite Abdominal pain, Abdominal swelling
<i>Cynoglossum lanceolatum Forssk.</i>	Boraginaceae	Herb	Chopped root or crushed and dried root mixed with butter	Mastitis
<i>Solanum anguivi Lam.</i>	Solanaceae	Shrub	Dried and crushed leaves mixed with butter	Mastitis
<i>Ajuga integrifolia Buch.-Ham.</i>	Lamiaceae	Herb	Chopped leaves mixed with water	Internal Parasite

<i>ex D. Don</i>				
<i>Vernonia amygdalina Del.</i>	Asteraceae	Tree	Crushed seed mixed with water and filtered	Equine Colic, Pastuerollosis, Abdominal pain, Malaria
<i>Solanum incanum L.</i>	Solanaceae	Shrub	Chopped leaves mixed with water and then sieved	Pastuerollosis
<i>Dalbergia lactea Vatke</i>	Fabaceae	Shrub	Crushed leaves mixed with water and then applied	Mastitis, Internal Parasite, local Swelling
<i>Tragia brevipes Pax</i>	Euphorbiaceae	Climber	Chewed the root and swallowed	Abdominal pain
<i>Croton macrostachyus Del.</i>	Euphorbiaceae	Tree	A Chopped bark is filtered and then orally drenching	Equine Colic, abdominal pain, Bloat
<i>Periploca lineari folia Quart.-Dill. & A. Rich</i>	Asclepiadaceae	Climber	Crushed leaves mixed with water and then applied	Mastitis
<i>Echinops amplexicaulis Oliv.</i>	Asteraceae	Herb	Root is grinded and mixed with water	Ulcerative lymphagitis
<i>Gardenia ternifolia Schumach. &Thonn.</i>	Rubiaceae	Tree	Leaf is crushed and mixed with water	Ulcerative lymphagitis
<i>Nuxia congesta R.Br. ex Fresen.</i>	Loganiaceae	Tree	A crushed bark is mixed with water	Equin-Joint swelling, Gemtokie(Re-disease)
<i>Acokanthera schimperi (A.DC.) Schweinf.</i>	Apocynaceae	Shrub	Fresh leaves/stem barks crushed and pounded with water, filtered and drunk until recovery Dry seeds tied on the neck for children	Gonorrhoea Amoeba Evil eye
<i>Aloe sp.</i>	Aloaceae	Herb	Fresh leaf latex taken orally	Intestinal parasites
<i>Artemisia abyssinica Sch. Bip.</i>	Asteraceae	Herb	Fresh leaf crushed and pounded with water, filtered and drunk until recovery made	Malaria
<i>Argemone mexicana L.</i>	Papaveraceae	Herb	Dry/fresh leaves crushed, pounded and filtered then infusion drunk in the middle of night	Diabetes
<i>Arundodonax L.</i>	Poaceae	Shrub	Dry leaves crushed and pounded with water, and then drunk in the morning Dry leaves crushed and pounded and then parted on the wound	Intestinal parasites Wound
<i>Bersama abyssinica Fresen.</i>	Meliantaceae	Tree	Dry leaves burned and mixed with butter, then parted in open sun light	Skin infection
<i>Calpurnia aurea (Ait.) Benth.</i>	Fabaceae	Srurb	Fresh leaves pounded and painted on the head Dry/fresh leafs pounded and putted on the wound or washed until recovery Fresh leaves pounded and sprayed on the infected skin on sun light	Head infection Wound Skin infection
<i>Carica papaya L.</i>	Caricaceae	Tree	Fresh leaves are boiled with water and cooled then drunk in the morning Dry/fresh seeds is pounded with water and drunk three times Fresh fruit taken orally	Intestinal parasites Malaria Gastric illness
<i>Catha edulis (Vahl.) Forssk. exEndl.</i>	Celastraceae	Shrub	Dry/fresh roots crushed, boiled, filtered, cooled and drunk until recovery	Amoeba
<i>Citrus limon (L.) Burm. F.</i>	Rutaceae	Shrub	Fresh fruits juice are drunk	Blood pressure
<i>Citrus sinensis (L.) osb.</i>	Rutaceae	Shrub	Fresh fruits juice are drunk	Gastric illness, Common cold
<i>Commelina benghalensis L.</i>	Commelinaceae	Herb	Leaf/stem Latex rubbed on infected part	Skin infection
<i>Cordia africana Lam.</i>	Boraginaceae	Tree	Fresh stem bark chewed	Teeth problem and sudden Sickness
<i>Clutia abyssinica Jaub. And spach.</i>	Euphorbiaceae	Herb	Fresh roots chewed Fresh leaves crushed and pounded, the powder sprayed on the affected part	Toothache, To kill cockroach and bug
<i>Cucurbita pepo L.</i>	Cucurbitaceae	Climber	Dry seeds are cocked and eaten in the morning.	Tape worm and Ascaries
<i>Cynoglossum coeruleum (Hochst. ex. A. rich.)</i>	Boraginaceae	Herb	Fresh roots chewed and sprayed on swollen part	Body swelling
<i>Datura stramonium L.</i>	Solanaceae	Herb	Fresh leaves pounded and parted on the head	Head infection
<i>Delonix regia (Boj. ex Hook.) Raf.</i>	Fabaceae	Tree	Dry/fresh leaves crushed, boiled and filtered, then the decoction drunk in	Diabetes Acute bleeding

			the middle of night Fresh leaf extract are parted on the wound	Wound
<i>Ekebergia capensis</i> Sparrm.	Meliaceae	Tree	A grinded bark is boiling	Rabid animal, Rabid human
<i>Dodonaea angustifolia</i> L. f.	Sapindaceae	Shrub	Chopped leaves mixed with water and filtered	Retained placenta Distocia
<i>Clerodendrum myricoides</i> (Hochst.) Vatke	Lamiaceae	Shrub	Chopped root is mixed water	Mastitis, Teeth pain/disease
<i>Calpurnia aurea</i> (Ait.) Benth.	Fabaceae	Shrub	Crushed leaves mixed with water	Internal Parasites, Pasteurollosis, mastitis, dermathophillosis, ectoparasites (tick, fleas, lice)
<i>Thumbergia alata</i> Boj. ex Sims	Acanthaceae	Climber	Crushed leaves mixed with water and filtered, and the sediments applied topically	Internal Parasites
<i>Phytolaccadodecandra</i> L 'Herit.	Phytolaccaceae	Shrub	Crushed Leaves and mixed with water	T.equiperdium, skin disordered
<i>Platostoma Rotundifolium</i> (Briq.) AJ Paton	Lamiaceae	Herb	Crushed Leaves and filtrated	Trachoma
<i>Vigina</i> sp.	Fabaceae	Climber	Chopped leaves mixed with water and filtered	Trypanosomosis
<i>Zehneria scabra</i> (Linn.) Sond.	Cucurbitaceae	Climber	Crashed root mixed with water and filtered	Trypanosomosis
<i>Erythrina brucei</i> Schwein.	Fabaceae	Tree	Crushed bark mixed with water and filtered	Trypanosomosis
<i>Maesa lanceolata</i> Forssk.	Myrsinaceae	Tree	Crushed leaves mixed with water and then filtered	Leech infestation
<i>Nicotiana tabacum</i> L.	Solanaceae	Shrub	crushed leaves mixed with water and then filtered	Leech infestation, tick infestation
<i>Hagenia abyssinica</i> (Brace) JF. Gmel.	Rosaceae	Tree	Leaves chopped mixed with water and sieved	Internal parasite
<i>Iresine herbstii</i> Lindl.	Amaranthaceae	Herb	Chopped leaves and mixed with water	Trypanosomosis
<i>Chenopodium ambrosioides</i> L.	Chenopodiaceae	Herb	Crushed the whole herbaceous parts and then mixed with little water	Internal Parasite, Abdominal pain, Abdominal swelling
<i>Urera Philodendron</i> (A. Rich.) Wedd.	Urticaceae	Shrub	Chopped Leaves and mixed with water	Retained placenta
<i>Flacourtia indica</i> (Burm. f) J Merr.	Flacourtiaceae	Tree	Crushed leaves mixed with water and filtrated	Pasteurollosis
<i>Fagaropsis angolensis</i> (Engl.) Dale	Rutaceae	Tree	Chopped bark of the tree is mixed with water and then filtered	Babesiosis
<i>Lobelia giberroa</i> Hemsl.	Lobeliaceae	Shrub	Crushed leaves mixed with water	Blackleg
<i>Brucea antidysenterica</i> JF. Mill.	Simaroubaceae	Tree	Chopped seeds mixed with water and then filtered	Epizootic lymphagitis
<i>Leucas deflexa</i> Hook. f	Lamiaceae	Herb	Chopped leaves mixed with water and then filtered	Pasteurollosis
<i>Acacia dolichocephala</i> Harms	Fabaceae	Tree	Taking dried root parts & fumigating the patient	Evil eye (Driyaa)
<i>Asparagus africanus</i> Lam.	Asparagaceae	Climber	Crushing the lives, making solution, adding honey & drinking one water glass.	Cold disease (Gamtokke)
<i>Balanites aegyptiaca</i> (L.) Del.	Balanitaceae	Shrub	Chopping the bark, making s/n & giving a coffee cup for humans & 1-2 liters for livestock 2 times a day for a total of 5days to cure 40 days passed rabies infection.	Rabies
<i>Bersama abyssinica</i> Fresen.	Meliantaceae	Shrub	Crushing the leaves with the flower of Solanumincanum, young leaves of Ehretiacymosa & Zingiberofficinale & spiting into the mouth of the child.	Inflammation of children's mouth
<i>Buddleja davidii</i> Franch.	Loganiaceae	Shrub	Pounding the leaves, making s/n & giving half a coffee cup atonce.	Tonsillitis
<i>Calpurnia aurea</i> (Aiti) Benth.	Fabaceae	Shrub	Rubbing the leaves with hands & smelling it to the animal or crushing the leaves, making s/n& dropping some droplets through thenostrils.	Early maturity of the udder
<i>Capparis tomentosa</i> Lam.	Capparidaceae	Climber	Chewing the root bark with the infected teeth.	Tooth ache
<i>Carissa spinarum</i> L.	Apocynaceae	Climber	Chewing the root or crushing the root,	Cold disease

			boiling it & drinking one water glass once.	
<i>Clematis hirsute</i> Perr. & Guill. Ranunculaceae	Ranunculaceae	Climber	Pounding the leaves, making s/n & drinking half of small glass & applying certain amount of the solution into the whole of the wound by using syringe or other domestic material. The residues should put on the opening of the wound.	Bone cancer, gland TB & Swelling which forms deep wound
<i>Clerodendrum myricoides</i> (Hochst.) Vatke	Lamiaceae	Shrub	Crushing the roots, mixing it with butter and applying it on the Infected part.	Breast cancer of cattle
<i>Clutia lanceolata</i> Forssk.	Euphorbiaceae	Herb	Crushing the root, boiling it & giving one water glass. Pounding the leaves, if necessary adding butter & applying on the infected part.	Hepatitis of cattle
<i>Coffea arabica</i> L.	Rubiaceae	Shrub	Roasting the seeds & leaves, crushing, boiling & drinking it as necessary Put on the seed powder on the wound	Dizzy ness & headache. Wound
<i>Combretum molle</i> R.Br. ex G. Don.	Combretaceae	Tree	Fumigating the patient.	Evil eye
<i>Crabbea Velutina</i> S. Moore	Acanthaceae	Herb	Chopping the leaves & roots together, making solution & dropping one coffee cup through the nostrils	Dropping saliva
<i>Crinum abyssinicum</i> Hochst. ex A. Rich.	Amaryllidaceae	Herb	Pounding the leaves, making s/n & giving one water glass 2 times a day until the animal is cured.	Swelling of the skin around the stomach
<i>Crotalaria albicaulis</i> Franch.	Fabaceae	Shrub	Crushing the root, boiling it & washing part of the body where pain is feeling without touching the ground with legs.	Evil eye (pain of all parts of the body)
<i>Croton macrostachyus</i> Del.	Euphorbiaceae	Tree	Crushing the bark, making s/n & giving one liter for Black leg. Crushing the bark, boiling it & giving one coffee cup for humans & one water	Black leg, ring worm & tapeworm
<i>Discopodium penninervium</i> Hochst	Solanaceae	Shrub	Crushing or burning the leaves & applying the crushed form or the ash on the infected part of the body.	Eczema
<i>Dodonaea angustifolia</i> L. f.	Sapindaceae	Shrub	Pounding the leaves, making s/n if possible adding Megado salt & giving small amt through the nostrils & one coffee cup orally once for all.	Diarrhea of calves
<i>Euphorbia amphiphylla</i> Pax.	Euphorbiaceae	Tree	Taking some amount of the latex, cooking it with Qocho bread & eating it once for all.	Gonorrhea
<i>Euphorbia cryptospinosa</i> Bally	Euphorbiaceae	Climber	Crushing internal part of the root with the roots of <i>Solanum incanum</i> & <i>Osyrisquadripartita</i> , making s/n & adding honey then drinking as necessary when the patients become thirsty.	TB
<i>Hagenia abyssinica</i> (Bruce) J. F. Gmelin	Rosaceae	Tree	Pounding the leaves & seeds together, making s/n & giving one water glass orally for cattle.	Swelling of stomach & tapeworm
<i>Haplocoelum foliolosum</i> (Hiern) Bullock	Sapindaceae	Shrub	Chewing a handful of ripened seeds and Swallowing it.	
<i>Hordeum vulgare</i> L.	Poaceae	Herb	Slightly toasting and grinding the seeds, preparing soup and drinking it as necessary for humans. Giving some amount	Broken bones & worn out tissues

2.8 Uses of medicinal plants other than their medicinal values

As it has already reported, medicinal plants are used for different purposes namely, as food, charcoal, fire wood, construction, fodder, forage, ornamental, spices, etc. many medicinal plants are used as a food. For instance plants like *Allium sativum* (Alliaceae), *Capsicum annum* (Solanaceae), *Carissa spinarum* (Apocynaceae), *Citrus limon* (Rutaceae), *Coffea arabica* (Rubiaceae), *Cordia africana* (Boraginaceae),

Dovyalis abyssinica (Flacourtiaceae), *Embelia schimperi* (Myrsinaceae), *Ensete ventricosum* (Musaceae), *Ficussur* (Moraceae), *linum usitatissimum* (linaceae), *Trigonella foenum-graecum* (Fabaceae), *Urtica simensis* (Urticaceae), *Ximenia americana* (Olacaceae) [89, 88, 90, 77].

The pharmacologically active constituents in plants used as food would likely have a great impact on medicinal plant species than those in plants used as medicine which are taken only in small amounts [24]. Other medicinal plants like

Eucalyptus globulus, *Prunus africana*, *Hagenia abyssinica*, *Acacia abyssinica*, *Allophylus abyssinicus*, *Cordia africana*, *Juniperus procera*, *Milletia ferruginea*, *Olea europaea subsp. cuspidata* and *Vernonia amygdalina* are used as a fire wood, constructing and charcoal. Others like *Zingiber officinale* and *Coriandrum sativum* are used as a spice [4]. Adding to this [85, 26] noted that traditional medicinal plants are also used as raw materials for the manufacture of modern drugs.

2.9 Integration of traditional medicines with modern medicines

In Ethiopia health care coverage, management of disease and disorders is believed to be improved by the integration of modern and traditional medicines. According to [47], the adaptability base for the development of modern drugs is facilitated by keeping the efficacy, and quality of traditional medicines. This promotes its integration to the modern health system of the country. Integration in this case is an increase of health coverage through collaboration, communication, harmonization of the modern system with that of the traditional one while ensuring intellectual property, right and protection of traditional medicinal knowledge.

Integration of the two systems is believed to be crucial due to the fact that people with different cultures, beliefs and locality have their own unique knowledge of traditional medicines and this helps for the development of modern health system [65, 18, 87, 17, 79, 10].

2.10 Sources of medicinal plants

According to [32] medicinal plants species are grown in the natural ecosystem. Similarly, the work of [70] indicated that most of the medicinal plants in Ethiopia are collected from the wild, some are cultivated and some others are grown in home gardens either purposely for medicinal use or non-medicinal purpose [89].

According to [88], plant species cultivated in Ethiopian home gardens for the purpose of medicine is about 6%. This figure indicates that a large number of medicinal plant species that are used by the herbalists are collected from the natural vegetation. Local forests are sources of plant processes into therapies used in traditional medical system [9]. The natural ecosystems of the forests, grass lands, wood lands, wet lands, field margins, contain a significant number of medicinal plants species. These are places where traditional healers and other members of the community collect medicinal plant species and use it [21].

2.11 Threats and conservation of medicinal plant species

2.11.1 Treats to medicinal plant species

Ethiopia's traditional medicine, as elsewhere in Africa, is faced with problems of continuity and sustainability [22]. As medicinal plants are part of the total plant of the different ecosystems of the earth, they are affected by anthropogenic and natural forces. And majority of medicinal plants utilized in Ethiopia are part of forest and rangeland. Therefore, most off the threats to the forest and rangeland plants are also threats to medicinal plants. Nowadays herbal practitioners have to walk greater distance for collection of herbal medicine that once grew in the vicinity of their homes. This is because of availability of plants in general and medicinal plants in particular have been affected by a dramatic decrease in areas of native vegetation [15]. The primary causes of this problem are loss of species of medicinal plants, loss of habitats of medicinal plants and loss of indigenous knowledge

[22]. Some studies have shown that most of the medicinal plants utilized by Ethiopian people are harvested from wild habitats [56, 71]. And hence this aggravates the rate of loss of species with related indigenous knowledge and loss of widely occurring medicinal plant species.

According to [88], people use many wild species of plants for food, closing, shelter, fuel, fiber, income generation and the fulfilling of cultural and spiritual needs throughout the world in addition to medicinal value. These threats to medicinal plants can be categorized into anthropogenic and natural causes. The threatened factors can be elaborated as lose of cultural diversity including traditional knowledge due to, uncontrolled grazing, drought, agricultural expansion, fire wood, charcoal, urbanization and construction, expansion of invasive species, pollution and in general climate change [49, 57]. It has also been reported that medicinal plant species are affected by unsustainable harvesting for export and extraction of pharmaceuticals [26, 85]. And also a natural cause includes recurrent drought, disease, pest out breaks and bush fires [22].

Beside to these known factors which treat medicinal plant species, other condition like the types of the medicinal plant and the part used also affect the medicinal plant. Moreover, uprooting and unsustainable utilization are the major threats to medicinal plants in Ethiopia. For example harvesting the roots and barks of medicinal plant possess more of a threat than collecting leaves for medicinal value [20, 38]. Besides to other factor, the younger generation under estimate the traditional system of healing [65] and this is bad fortune for the advancement and the conservation of medicinal plants and associated knowledge. Proper management of traditional medicinal plant resources is important, not only because of their value as a potential source of new drugs, but due to reliance on traditional medicinal plants for health.

2.11.2 Conservation of medical plants

As it was stated by [2] conservation should be aimed at conserving maximum diversity within each species to ensure that its genetic potential will be available in the future. Sustainable management of traditional medicinal plant resources is important not only because of their value as a potential source of new drugs built also due to reliance on traditional medicine for health [14]. There is some conservation actions that have been undertaken around the world designed to protect threatened medicinal plants from further damage [15]. This includes in-situ and ex-situ conservation measures. Both in-situ and ex-situ conservation efforts are implemented to capture medicinal plant genetic resources. In-situ conservation is conservation of species in their natural habitats.

Some traditional medicinal plants have to be conserved in-situ due to difficulty for domestication and management [88]. Medicinal plants can also be conserved by ensuring and encouraging their growth in special places, as they have been traditionally [88]. This can be possible in place of churches, mosques, graves yards, farm margin, and river bank and so on. An account that have been made by [14] indicated that plant species whether medicinal or non-medicinal plants grown in religious sites like churches, mosques and the like are forbidden to be cut.

The second one is ex-situ conservations means conservation outside their natural habitats. This includes gen bank, botanical gardens and others. As it was reported, home gardens have a great contribution to conservation of biodiversity in general and at the same time medicinal plants species can also be conserved, thus home gardens are

strategies and ideal farming systems for the conservation, production, and enhancement of medicinal plants [89, 88]. Some efforts have been made to conserve and promote sustainable utilization of medicinal plants in Ethiopia. For example, EBI has established *ex situ* conservation sites in representative areas of the country, including Won do Genet and Bale-Goba medicinal plants filed gene banks. In the field, medicinal plants conservation goes side by side with conservation of ethnobotanical and ethnopharmacological information. Ethnobotanical studies can indicate management problems of medicinal plants through interviews and market surveys and furthermore, it gives solutions by promoting local traditions and customs that had conservation merits [33, 80]. According to [64], the wise use of medicinal plants species needs the involvement of different sectors and greater public support and for this, awareness creation is recommended.

2.12 Recommendations

Based on the review findings, the following recommendations are suggested:

- Local people harvest plants from the forest for different purposes with little awareness of its threat, in all part of Ethiopia, so awareness creation among the society must be done.
- The local communities in all part of Ethiopia should be involved in conservation and management of plants in general and medicinal plants in particular.
- There is loss of indigenous knowledge in most part of Ethiopia, some traditional healers give much attention to the indigenous knowledge transfer and the others have little concern regarding the value of indigenous knowledge, so the concerned body must encourage the traditional healers by participating in awareness arising for the healers to minimize the loss of indigenous knowledge.
- Further and relevant scientific research should be conducted on medicinal plants to dig out their quality, efficacy and safety and this helps to ignore the unwanted part and to accept the best part of it. These plants with known therapeutic activities should be given special concern and develop modern dosage forms of drugs from those medicinal plants.
- Establishing Traditional Healers Associations by providing supports like land, fund and assistances for cultivations of medicinal plants in most part of Ethiopia would help to conserve medicinal plants.

Trainings should be given to the practitioners on the best way to collect, document, use, store and conserve the medicinal plants. This training helps practitioners' to widen the already existing knowledge of their own and helps to improve the quality of the herbal drugs.

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